

Johns Hopkins University

**ELECTRONIC RESEARCH ADMINISTRATION (ERA) SYSTEMS AND  
PRE-AWARD GRANTS MANAGEMENT: A REVIEW OF MU-JHU  
CARE LIMITED PRE-AWARD PROCESSES AND MANAGEMENT**

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by

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## **Abstract**

Research Administration is a huge endeavor with several processes to manage and many regulations to follow. A common challenge with research administration is the broad scope of work required to maintain compliance and transparency in the processes. This is further encumbered by the onerous agency regulations specifically for federally funded projects. The Makerere University (MU)-Johns Hopkins University (MU-JHU) Care Limited receives majority of financial support for its research projects from U.S. federal funds. MU-JHU receives most of its funding support as subawardees with a few prime awards and there is a growing need to increase the number of prime awards at the institution. The need to increase prime awards and the lack of an Electronic Research Administration (eRA) system at MU-JHU to support pre-award grants management were the key stimuli for the capstone project.

The pre-award processes at MU-JHU are manually managed which lengthens time requirements. Additionally, the lack of an integrated eRA system makes continuous improvement complicated due to the related administrative burden of managing these processes in silos. Deploying an integrated grants management solution will enable MU-JHU to improve the proposal preparation processes, reduce duplicative efforts and ultimately reduce administrative burden. The project examined the pre-award research administration processes at MU-JHU and made recommendations to implement an integrated eRA system to manage pre-award processes. If phase 1 (solution for pre-award management) is successful, it lays the foundation for recommendations to fully implement a solution that encompasses functions for the entire grants life cycle – cradle to grave grants management solution.

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## Glossary

**Administrative burden:** Research administrative activities that contribute to the complexity of work, create bureaucracy and often lead to delays and diminish efficient execution of research activities.

**Closeout:** Process by which project activities are concluded ensuring that all applicable administrative actions are completed including the final financial report, final progress report, final inventory report, final invention report.

**Decision Matrix:** Used for priority ranking and forming the justification for a decision.

**Electronic Research Administration (eRA):** Integrated software for grants management to reduce redundancies, improve efficiency and reduce administrative burden. The National Institutes of Health states that eRA “Provides electronic systems support to manage the receipt, processing, review, award, and monitoring of billions of dollars worth of research and non-research grants awarded annually.”<sup>1</sup>

**eRA Commons:** The Electronic Research Administration (eRA) Commons is a centralized virtual interface to disseminate and receive information used by the NIH.

**Extramural:** Funds supported by an agency to an external institution

**FastLane:** National Science Foundation (NSF) online interactive portal used for NSF grants related activities.

**G11:** Activity code for grants to “provide funds to institutions eligible to participate in the NIH Extramural Associates Program for establishing or enhancing an office of sponsored research and for other research infrastructure needs.”<sup>2</sup>

**Grants.Gov:** Single access online portal designated by the Office of Management for agencies to announce funding opportunities and support grant applications.

**Just-In-Time:** Request for additional information after review of an application which may be considered for funding

**Post-Award:** Activities of a research project after the project is awarded. These activities may include project monitoring and budget monitoring.

**Pre-Award:** In research, this involves proposal preparation processes and submission.

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<sup>1</sup> NIH, Electronic Research Administration (eRA), Accessed July 9 2019  
[https://grants.nih.gov/aboutoer/oer\\_offices/suboris\\_era.htm](https://grants.nih.gov/aboutoer/oer_offices/suboris_era.htm)

<sup>2</sup> NIH Grants and Funding Activity Codes, Accessed July 9, 2019,  
[https://grants.nih.gov/grants/funding/ac\\_search\\_results.htm?text\\_curr=G11&Search\\_Type=Activity](https://grants.nih.gov/grants/funding/ac_search_results.htm?text_curr=G11&Search_Type=Activity)

**Process Mapping:** Analysis of a process to determine how it's done and identify any areas for improvement

**Research Administration:** Involves the management of processes through the life cycle of a research project. That is management of the pre-award, award, post-award and closeout activities of a research project.

**Research Administrator:** Officer responsible for routinely providing grants related support to Principal Investigators (PIs) and researchers

**Research Portfolio:** The number of research projects managed by an institution.

**Source of Truth:** Concept to mean a centralized source of information to ensure uniformity of information accessed through information integration.

**Subaward:** “An award provided by a pass-through entity to a subrecipient for the subrecipient to carry out part of a Federal award received by the pass-through entity.”<sup>3</sup>

**Workflow Routing:** Levels through which an activity passes for review, submission or approval.

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<sup>3</sup> NIH Glossary & Acronym List, Accessed July 9 2019,  
<https://grants.nih.gov/grants/glossary.htm#S>



## **Abbreviations**

ACTG	AIDS Clinical Trials Group
AHRQ	Agency for Healthcare Research and Quality
AIDS	Acquired Immune Deficiency Syndrome
AOR	Authorized Organizational Representative
CDC	Centers for Disease Control
COGR	Council on Government Relations
DOD	Department of Defense
EC	Electronic Commerce
EDCTP	European and Developing Countries Clinical Trials Partnership
ERP	Enterprise Resource Planning
FASEB	Federation of American Societies for Experimental Biology
FDP	Federal Demonstration Partnership
HIPAA	Health Insurance Portability and Accountability Act
HIV	Human immunodeficiency virus
HIVNET	HIV Network for Prevention Trials
HPTN	HIV Prevention Trials Network
HR	Human Resource
IEARDA	International Extramural Associates Research Development Award
IHE	Institution of Higher Education
IMPAACT	International Maternal Pediatric Adolescent AIDS Clinical Trials
IT	Information Technology
JIT	Just-In-Time
LMIC	Low Middle-Income Countries
MRC	Medical Research Council
MTN	Microbicides Trials Network
MU-JHU	Makerere University Johns Hopkins University

NIH	National Institutes of Health
NSB	National Science Board
NSF	National Science Foundation
OMB	Office of Management and Budget
PI	Principal Investigator
PTE	Pass-Through Entity
QA/QC	Quality Assurance/Quality Control
R&D	Research and Development
REDCap	Research Electronic Data Capture
S2S	System-To-System
SBIR	Small Business Innovation Research
USAID	United States Agency for International Development
USG	United States Government

## **Chapter 1. Introduction**

Research Administration contains a set of complex activities throughout the life of a grant from pre-award, award, post-award, and closeout grant activities. For efficient and effective grants management it's essential to utilize Electronic Research Administration (eRA) systems to reduce administrative burden and assist researchers to focus on core research-related activities. The Federal Demonstration Partnership (FDP) report indicates that Principal Investigators (PIs) were spending "an average of 42% of their research time on administrative responsibilities related to federally funded projects rather than conducting active research."<sup>4</sup> A significant portion of this time in the report findings indicated that half of this time, about 21.1% is spent on pre-award administration split as follows; 15.4% on Proposal Preparation and 5.7% on Pre-Award Administration.<sup>5</sup>

The grant accountability project initiated by the Domestic Working Group chaired by the Comptroller General of the United States in 2005 highlights why it's important to have an integrated system to manage grants and states that "Consolidating information systems can enable agencies to better manage grants by providing information on all grants. This is beneficial because agencies often have numerous grant programs addressing similar needs."<sup>6</sup>

### **1.1. Brief background of MU-JHU Care Limited (the institution)**

MU-JHU Care Limited referred to in this project as MU-JHU is a collaboration established in 1988 between Makerere University (MU) (a local Ugandan University) and

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<sup>4</sup> Sandra L. Schneider et.al, Federal Demonstration Partnership (FDP), 2012 Faculty Workload Survey, Released: April 2014, accessed June 13 2019

<sup>5</sup> Ibid

<sup>6</sup> Grant Accountability Project, Guide to Opportunities for Improving Grant Accountability, 2005

Johns Hopkins University (JHU) (a US-based University). The primary objective of the collaboration is to improve the health status of families infected and affected by Human immunodeficiency virus (HIV)/Acquired Immune Deficiency Syndrome (AIDS) through research, training, prevention, and care. Clinical trial funding has been primarily from the United States Government (USG), through its National Institutes of Health (NIH) HIV clinical trial networks, including the former HIV Network for Prevention Trials (HIVNET) and ongoing HIV Prevention Trials Network (HPTN), International Maternal Pediatric Adolescent AIDS Clinical Trials (IMPAACT), Microbicides Trials Network (MTN), AIDS Clinical Trials Group (ACTG) networks, as well as funding from Centers for Disease Control (CDC), Department of Defense (DOD), United States Agency for International Development (USAID) and NIH and other non USG funding such as United Kingdom Medical Research Council (MRC) and European and Developing Countries Clinical Trials Partnership (EDCTP) funded research.

MU-JHU's research portfolio currently involves several network and non-network studies to a total of about 49 studies/projects (network studies: 29, non-network studies: 20). These projects require meticulous monitoring of budgets and project activities to ensure institutional and sponsor compliance requirements are met. This research portfolio is managed by a grants management team of three (3) core staff with support from a multidisciplinary team including regulatory and compliance teams; the Quality Assurance (QA)/Quality Control (QC) team; Data team and the study Principal Investigators.

Management of specifically the pre-award processes at MU-JHU is still predominantly manual. This project will review eRA systems/software for pre-award

management at MU-JHU to reduce administrative burden, streamline the proposal preparation processes as well as support institutional and sponsor compliance processes. The desirable eRA system should contain features that allow easy access to search for relevant funding opportunities, create workflow approvals, proposal preparation support and tracking of the award.

## **1.2. Background.**

The current research administration enterprise is hyper-competitive and there's increased competition for shrinking federal funds. As a result, it is critically important to improve and streamline research administration processes to be good stewards of sponsor funds. Research administration has a myriad of interconnected activities and these can be streamlined and managed through the implementation of an eRA system.

MU-JHU currently has no eRA system to manage most of the research administration processes. The Enterprise Resource Planning (ERP) system available at the institution is Navision which mainly supports finance, procurement, human resource, and inventory management functions. The purpose of this capstone project is to examine the pre-award research administration processes that are done manually at MU-JHU, map out each process and examine how they could be automated to streamline proposal preparation and submission processes, efficiently monitor project requirements, improve grants management and sponsor compliance. Streamlined processes will reduce administrative burden, improve institutional and sponsor compliance and potentially increase the number of proposals submitted as well as potentially improve the success rate of grant applications through submission of error-free proposals.

### **1.3. Statement of the Problem.**

Most of MU-JHU's awards are federally funded through the subaward instrument with flow-down regulations from the Pass-Through Entity (PTE). Federal sponsors are highly regulated and there are challenges of managing compliance requirements and meeting time-consuming reporting and tracking of sponsor requirements.

The research administration processes at MU-JHU are mostly managed manually. The existing Navision system primarily supports finance, procurement and inventory management functions. This system is not fully comprehensive to support the full scope of functionality and is missing critical modules to manage activities across the research administration continuum.

The current grant application landscape is highly competitive and this requires that proposals submitted are also highly competitive and meet all sponsor requirements. Diversification of funding in institutions is critical and to fully take advantage of the opportunities for funding, this requires rigorous submission of sponsor compliant grant proposals to favorably compete for funding. MU-JHU manages the proposal routing, approval and submission processes manually which increases the possibility of errors and yet audit of an award starts with the proposal. An eRA system is required to improve compliance, increase chances of success and create transparency in the pre-award phase of proposal preparation and submissions as well as management when the grant is awarded.

Managing several grants becomes an administrative complexity if there's no eRA system in place to consolidate grants management. The possibility of losing track of pertinent information as it relates to each grant is heightened. Lack of a comprehensive

system to organize and track grants increases the risk of non-compliance with sponsor requirements. Non-compliance with sponsor requirements may subsequently be detrimental to continued and future funding of research projects at the institution. The reason compliance is essential during proposal preparation and submission is highlighted by Jeremy Hall stating that “The better you are able to make your proposal fit those guidelines, the better chance your application has of being reviewed and funded. Many funders will not consider proposals that fail to meet their submission requirements.”<sup>7</sup>

Therefore it’s important that an eRA system is implemented at MU-JHU to automate research administration processes; reporting; workflow routing and approval; submission of proposals; budget development; compliance monitoring; and award notifications. The favorable eRA system should contain features that provide a single user interface for administrative support staff, allows research administrators to provide better customer service to PIs and researchers and a system with an integrated “source of truth” from which all grants related information can be retrieved.

#### **1.4. Project Question.**

The research questions that guided this capstone project include the following;

1. What are MU-JHU’s current research administration processes?
2. How are the research administration processes at MU-JHU currently managed?
3. Is there an eRA system in place to consolidate management of these processes and what are the identified gaps in the current eRA system?
4. Will an eRA system improve MU-JHU’s research administration processes and reduce the administrative burden?

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<sup>7</sup> Jeremy L. Hall, Grant Management: Funding for Public and Non Profit Programs, Jones & Bartlett Publishers, USA, 2010

5. What eRA systems are in existence that would comprehensively improve management of MU-JHU's research administration processes?

### **1.5. Project Objectives.**

Submission of grant proposals is important to expand the funding base for research projects. Success rates are increased if the proposal is sponsor compliant and particularly important to note if the project is federally funded. Managing pre-award, post-award and closeout project activities as per sponsor regulations are important for continuity and sustainability of an institution. Establishing an eRA system to manage these processes will reduce risk of non-compliance, reduce administrative burden and ultimately improve sponsor compliance, reporting requirements and streamline grants management processes. The objectives for this capstone project include;

1. To examine MU-JHU's research administration processes and identify gaps in the current processes
2. To streamline grants management processes through the implementation of eRA software
3. To review eRA systems with a proven track record to manage research administration processes in US-based Institutions of Higher Education and research institutions
4. To analyze the information gathered on robust eRA systems and make recommendations to MU-JHU management for institutional buy-in and implementation
5. To develop a decision matrix with priority areas to inform a decision on software recommendations



## **1.6. Significance.**

This project is driven by the need to improve research administration processes at MU-JHU to ensure good stewardship of sponsor funds and submission of competitive proposals to expand the funding base as well as expand the research portfolio. An eRA system to streamline proposal preparation and monitor compliance is essential for efficient project performance for continued funding, accountability, and sustainability of project activities. This project will provide the requisite information to guide recommendations and decision for eRA software to facilitate research administrators to manage pre-award processes specifically as they relate to proposal preparation and submission, reduction of administrative burden and elimination of manual tracking of research administration processes.

## **1.7. Exclusions and Limitations.**

MU-JHU has no system to centrally coordinate and manage research administration processes and the modules in the ERP system do not support pre-award grants management and review of other research institutions in Uganda also indicated that these institutions lack integrated grants management software.

The major limitation of this project was the lack of sufficient references locally (in Uganda) of grants management software. As a result, the author thought it would be beneficial to narrow the scope of the project to pre-award processes. Focusing on pre-award processes lays the foundation for extensive analysis of the “cradle” of research administration processes to trigger the basis for future review and implementation of a more comprehensive system addressing post-award processes as well. Since eRA

concept is new to the institution, the incremental change with a focus on pre-award processes will be more reasonable and manageable for systems recommendations.

The other limitation to the project was that administering a questionnaire regarding grants management software to personnel involved in pre-award research administration would not be helpful since the institution currently has no grants management software. As a result, it was thought that a meaningful survey would not be accomplished without comparable variables. To that effect, no questionnaire was developed for this project and the project was based on a review of the institution's research administration processes and literature review of eRA systems established at US-based academic and research institutions to come up with recommendations of software appropriate for MU-JHU.

Lastly, the author has limited information on eRA systems and was introduced to these systems through the Assistive technologies for Research Administration course module. Therefore this project will also be a learning lesson for the author as well and the proposals and recommendations will mainly be on the basis of a review of systems in other institutions specifically US-based institutions.

## **Chapter 2. Literature Review**

### **2.1. Overview and Details of Literature Review.**

The literature review for the capstone project focused on compliance with sponsor requirements during proposal preparation and submission and compliance requirements prior to and after submission of the proposal and review of how these functions can be supported by eRA systems to meet sponsor compliance requirements and reduce administrative burden. The review conducted also evaluated eRA systems at Institutions of Higher Education (IHE) and Research Institutions specifically US-based institutions to gain an understanding of the software and systems used to support these research administration functions.

The review was intended to answer the research questions proposed in this paper and gain a contextual understanding of the importance of eRA systems in supporting research administration processes. The literature review focused on the benefits of eRA systems to improve workflow in research administration processes, software to reduce administrative burden, software to promote sponsor compliance, and any challenges or gaps with eRA software.

### **2.2. The emergence of eRA Systems in the USA for Research Administration**

The author narrowed the review to the United States of America (USA) evolution of eRA due to the fact that the vast majority of MU-JHU's source of funds is federal funds. In the USA, the emergence of eRA systems was initially focused on Electronic Commerce (EC) and eventually grew to include electronic research administration software. Initiatives commissioned by President Clinton in 1993 led to a review of EC and the outcome was a report "Creating a Government That Works Better." In this report

four problems encumbering federal grants processes were identified: “1) too much red tape; 2) slow review and approval process; 3) inconsistent grant forms and criteria, and 4) redundant reporting requirements across federal agencies.”<sup>8</sup> This report was the cornerstone for subsequent reviews which led to the creation of several review groups to establish the most appropriate ways for standardized electronic grants management.

Notably, NSF and NIH developed eRA software to electronically manage grants processes, NSF with FastLane and NIH with eRA Commons and Grants.gov respectively. These portals are used to centrally manage and support research administration processes. The systems are role-based and there are functions that require approvals from the PI, Co-PI, Authorized Organizational Representative (AOR) and others as assigned in the systems. The way the NIH and NSF systems are set up is crucial for transparency, accountability, and efficiency in the research enterprise.

## **2.3. Benefits of eRA Systems in Research Administration**

### **2.3.1. Provision of Quality Services and Timely Execution of Activities**

Some of the benefits of automating research administration processes are the ability for research administrators to provide quality services to the institution. Grants management software ensures that research administrators focus their efforts on core aspects of grants performance and monitoring. Lack of software and manual management of research administration processes leads to spending considerable time on administrative paper management and manual monitoring which greatly impacts on the aforementioned core aspects of grants management.

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<sup>8</sup> Electronic Research Administration History, accessed June 9 2019, <https://www.osp.cornell.edu/eRA/History.htm>

Worth noting is the timeliness in supporting the various steps in the grants cycle (pre-award to post-award processes). Streamlined research administration processes ensure that proposals submitted are approved by the responsible institutional official and submitted in a timely manner. It should be emphasized that most agencies have a set application due date when submissions are expected. Failure to comply with due application dates may lead to rejection of the application. This is extremely devastating noting that significant portion of time and thought is put into preparing and submitting a proposal. Easy accessibility of information is also an advantage that reduces time spent on an activity. For example with Cayuse software, budget information can be accessed in real-time and the system also interfaces with other systems including payroll and salary details which can be helpful when developing budgets for proposals hence reduction in time spent on budget development.<sup>9</sup>

### **2.3.2. Centralized Repository for Grants Information**

eRA software can be utilized to create a centralized repository of grants related information. To remain competitive, institutions need to have a robust Research and Development (R&D) portfolio. For most research institutions in Low Middle-Income Countries (LMICs) are faced with funding challenges for their research projects. World Bank definition of LMICs “For the current 2020 fiscal year, low-income economies are defined as those with a GNI per capita, calculated using the [World Bank Atlas method](#), of \$1,025 or less in 2018; lower middle-income economies are those with a GNI per capita

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<sup>9</sup> Cayuse, accessed June 9 2019, <https://cayuse.com/products/>

between \$1,026 and \$3,995”<sup>10</sup> Uganda is one of the countries on the World Bank LMIC list.. It’s therefore important that research institutions in resource constrained countries such as those identified as LMICs, to rigorously submit proposals to sponsor agencies to fund research projects. Challenges with proposal preparation are several but some of the challenges can be alleviated through the creation of a web-based centralized repository for grants related information. A repository that is a “source of truth” to retrieve grants-related information to support proposal preparation e.g. budget and Human Resource (HR) related information, information to prepopulate biosketches and other support forms as may be requested for Just In Time (JIT) requests. JIT are requests from the award agency for additional information that was not part of the initial application. This information is requested for applications that have a high opportunity for potential award. The information in the grants repository will also be used to track and monitor reporting timelines and compliance with sponsor regulations. A centralized source of grants information will reduce time spent on proposal preparation. Board *et.al* highlights the importance of data integration stating that connecting of systems eliminates manual processes and reduces errors and the team involved in proposal submission is guided on the next steps of the process.<sup>11</sup>

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<sup>10</sup> World Bank Country and Lending Groups, accessed July 25 2019, <https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups>

<sup>11</sup> Board et.al, A New Vision for Research Administrative Systems Research Administrative Systems Working Group Report, North Western University, (November 7, 2013), accessed June 5 2019, <https://www.it.northwestern.edu/bin/docs/cio/new-vision-for-research-administrative-systems-report-110713.pdf>

### **2.3.3. Competition for Shrinking Funds**

Stiff competition for funding requires a set of strategies for success with the ultimate goal to submit an error-free application in a timely manner. To support the proposal preparation process, it's essential to utilize online intuitive software to support the process and validate errors prior to submission of proposals. An example of improved compliance and submission of error-free applications is the example of the University of Cincinnati which developed the eGrants system, aimed at automating pre-award and post-award processes. The implementation of eGrants led to compliance throughout all phases of the grant lifecycle and errors in grant preparation were reduced as well as a reduction in time spent with research management activities. "The initial outcomes of the program included a substantial increase in intramurally funded projects, a 200% increase in funds for educational research from local sources other than the medical school, and two new grants funded from extramural sources."<sup>12</sup>

### **2.4. eRA Systems and Collaborative Communication**

Collaborative interaction on a grant application using online software allows multiple grants staff to interface on the same application. As a result, there's transparency of application status, efficiency, tracking progress, improved communication for the team involved in the grant writing process and responsiveness to tasks. Grants team operating as a cohesive team with the aid of software improves quality of proposals, compliance and timely submissions. To advance science, team science has become popular and to fully exploit the advantages of team science, collaborative

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<sup>12</sup> Ricardo Pietrobon et.al, Duke Surgery Research Central: an open-source Web application for the improvement of compliance with research regulation, Published: 27 July 2006

software is crucial especially if research partners are located in different geographical locations.

## **2.5. Use of eRA systems for Compliance and Reduction of Administrative Burden**

Management of research administration processes without automation and software increases the administrative burden and this may also contribute to non-compliance with sponsor submission requirements. Federal sponsor agencies and many other agencies have extensive and sometimes onerous regulations and these keep evolving which increases administrative burden.

According to the Council on Government Relations (COGR) article by Mark Dutton,

There have been over fifty new regulations and over twenty revised regulations implemented and imposed that directly affect the conduct and management of research under federal grants and contracts. This may not sound like a lot to most people given that almost twenty-five years have passed since 1991. However, we must not forget that this includes changes made to circulars published by the Office of Management and Budget (OMB), including the new Uniform Guidance, and anyone familiar with any of these items knows it's not just the implementation of those changes and additions, but also the interpretation of them that can be burdensome.<sup>13</sup>

This statement from COGR clearly highlights the burdens related to complying with federal grants and contracts. Additionally, Dutton also points out that surveys carried out by several groups namely. The National Science Board (NSB); Federation of American Societies for Experimental Biology (FASEB) and the FDP indicates that most research related administrative top reported areas of burden were in the following areas:

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<sup>13</sup> Mark Dutton, Evaluating and Alleviating Administrative Burdens Placed on Research Funding, Posted on 12.02.15, <http://www.itworks-inc.com/2015/12/02/evaluating-and-alleviating-administrative-burdens-placed-on-research-funding/>



Financial Management Proposal Preparation and Submission; Effort Reporting and Personnel management.<sup>14</sup>

Specifically, the 2012 FDP survey findings correlated the areas of administrative burden with the time researchers spent on these activities. The findings showed time spent as follows; 15.4% on Proposal Preparation; 5.7% on Pre-Award Administration; 13.6% on Post-Award Administration; 7.6% on Report Preparation and 57.7% on Active Research.<sup>15</sup>

Analysis of these reports indicates that commonalities in the key areas of administrative burden include proposal preparation and submission and pre-award administration which are focus areas in the capstone project and a major challenge at MU-JHU. To alleviate administrative burden as proposed in the reports would entail the installation of user-friendly, configurable solutions to manage these key trouble areas as research administration evolves. The report findings concretize the need for software at MU-JHU to alleviate the administrative burden related to proposal preparation processes and overall pre-award management at the institution.

## **2.6. Review of Existing eRA Systems**

Disparities in grant application success rates and increased competition for funding specifically NIH funding requires a streamlined grant application process and compliance with sponsor regulations. Most funding agencies have a set of extensive submission regulations which if not met negatively impact on the success rate of an

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<sup>14</sup> Mark Dutton, Evaluating and Alleviating Administrative Burdens Placed on Research Funding, Posted on 12.02.15, <http://www.itworks-inc.com/2015/12/02/evaluating-and-alleviating-administrative-burdens-placed-on-research-funding/>

<sup>15</sup> Sandra L. Schneider et.al, Federal Demonstration Partnership (FDP), 2012 Faculty Workload Survey, Released: April 2014, accessed June 13 2019

application. Research institutions should be strategically positioned to compete for funding in an increasingly hyper-competitive environment. There are several factors contributing to the success of applications and these include but are not limited to:

- Searching for the appropriate funding opportunity, ensuring eligibility criteria is met and the research project fits within the mission of the funding agency;
- Meticulous attention to details and compliance with grant application guidelines and regulations;
- Streamlined institutional policy and processes for proposal routing, approval, and submission; and,
- Robust software to manage proposal routing, approval and system-to-system submission of applications.

The author focused on grants management software for the literature review of this section and the following systems were reviewed.

#### **2.6.1. Kuali**

Kuali was launched in August 2004 led by the Indiana University and the University of Hawaii. This partnership was later joined by four new partners when the Kuali project received an award of \$2.5M from the Andrew W. Mellon Foundation, namely; Cornell University, San Joaquin Delta College, Michigan State University, and the University of Arizona and the consortium has continued to grow. Manlu Liu et.al, indicate that the initial core mission of the Kuali consortium was to develop a baseline system for financial services. However, Kuali has continued to diversify the services to include modules such as research administration. To increase system flexibility, Kuali

uses the most up-to-date approaches and technologies such as open source, workflow, and service-oriented architecture.<sup>16</sup>

Particularly important and applicable to the pre-award processes, the Kuali system is enabled to facilitate routing and approval of transactions and centralizes communication flow. This is essential for the management of a diverse range of pre-award activities and efficiency in the execution of the activities. The fact that this a collaborative system would benefit institutions that are intending to partner creating a shared platform to manage projects and submission of applications by collaborators in different geographical locations. Additionally, as prior indicated, Kuali includes the ability to add new modules. The ability to customize an eRA system to add new features is important to review for a cost-effective eRA system. A cost-effective system is particularly important for institutions with limited resources. Manlu Liu et.al in their findings state that Kuali enhances system extensibility as it's a service-oriented architecture with adaptability to add new features. Kuali provides

The necessary facilities to enable various application modules to access enterprise services without being hardwired to these services. This helps the Kuali adopters extend the system by adding new modules while reusing much of these enterprise services.<sup>17</sup>

The workflow system is helpful in routing and authorization tasks and helps an organization streamline processes.<sup>18</sup>

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<sup>16</sup> Manlu Liu et.al, Achieving Flexibility via Service-Centric Community Source: The Case of Kuali, December 2007, accessed June 7 2019, <https://aisel.aisnet.org/cgi/viewcontent.cgi?article=1613&context=amcis2007>

<sup>17</sup> Ibid

<sup>18</sup> Ibid

### 2.6.2. InfoEd Global

The InfoEd website has a striking statement “More Research, not more Administration.”<sup>19</sup> This statement captures the greatest benefit of an eRA system for grants management. Research administration is complex and comes with enormous administrative requirements which contribute significantly to administrative burden if the processes are not streamlined and if there’s no software for efficient management. Additionally, on the InfoEd website, several pertinent questions are asked; “How much of time are you spending managing research administration? How many logins? How many disparate systems, tools, and applications are standing between you and your research?”<sup>20</sup> These are pertinent questions every research administrator and Principal Investigator (PI) should ask and definitely appreciate concrete answers on how to address.

The InfoEd system is designed to answer the aforementioned questions. The software is documentation-centric and allows workflow processes from the point of proposal preparation throughout the entire research lifecycle and even for publications. “One tool. One logon. One place for everything.”<sup>21</sup> Specifically, as this relates to the capstone project, InfoEd collaborative features allow “assembling of the proposal documents, manages electronic submissions and also allows routing, review, approval and electronic signature tracking. Just-in-time materials and award notices can also be tracked and reported on effectively.”<sup>22</sup>

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<sup>19</sup> InfoEd Global, Research Administration without boundaries, accessed June 7 2019, <https://infoedglobal.com/users/researchers-principal-investigators/>

<sup>20</sup> Ibid

<sup>21</sup> Ibid

<sup>22</sup> Ibid

Software with System-to-System (S2S) features is essential and InfoEd is designed to interface with other systems such as Grants.gov which is a primary portal for submission of most federally funded submissions. The software also prepopulates previously entered data and has built-in error checking mechanisms to validate applications.<sup>23</sup> For a research administrator, software with these features will significantly reduce redundancies, reduce time spent on assembling a proposal and the overarching benefits of reduction of administrative burden and submission of error-free applications.

At Brown University, an evaluation of previous systems established that InfoEd was the appropriate system to manage research administration processes. Five research administration systems were evaluated and the end result was that InfoEd was the best solution for Brown University. This decision was based on the functionality of the system, configurable portals and the product was considered to be the easiest to adapt to and the most intuitive.<sup>24</sup>

### **2.6.3. Cayuse 424**

The Cayuse suite was first created by Dr. Chris Harker in 1994. The initiative was based on the need to find solutions for easier less burdensome approaches to apply for grants. With a Small Business Innovation Research (SBIR) grant, Dr. Harker launched

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<sup>23</sup>InfoEd Global, Research Administration without boundaries, accessed June 7 2019, <https://infoedglobal.com/solutions/grants-contracts/pre-award/>

<sup>24</sup> Brown University, Research at Brown, accessed June 9, 2019 <https://www.brown.edu/research/conducting-research-brown/research-information-systems/infoed-project/infoed-project-about>

Cayuse 424, in 2006 and “Cayuse became the first vendor to successfully communicate System-to-System with Grants.gov through its flagship Cayuse 424 solution.”<sup>25</sup>

Cayuse has several advantages including robust error validation, pre-population of common fields and automated budget calculations. Due to the research administration supportive features in Cayuse system, nearly a third of the top 100 research institutions in the United States utilize this solution.<sup>26</sup>

The Cayuse research suite supports the following processes as indicated in the figure below extracted from the Cayuse website<sup>27</sup>

**Figure 1: Cayuse Research Suite**<sup>28</sup>



Figure 1 is indicative of the processes that support compliance, improve efficiency and reduce the administrative burden for research administrators and PIs to ensure that more time is utilized to support core research activities. Particularly, the Cayuse 424 suite offers a product which is central to this project; this particular suite validates proposals for error-free applications, allows data sharing from other systems, and has system to system (S2S) support for federal grants e.g. NIH, National Science

<sup>25</sup> Cayuse, accessed June 9 2019, <http://cayuse.com/company/>

<sup>26</sup> Ibid

<sup>27</sup> Cayuse, accessed June 9 2019, <https://cayuse.com/products/>

<sup>28</sup> Ibid

Foundation (NSF), Agency for Healthcare Research and Quality (AHRQ), CDC, Department of Defense (DOD), etc. This suite also supports multi-project proposals and also real-time budget access.<sup>29</sup>

#### **2.6.4. Huron Consulting Group**

Huron also proposes to reduce the administrative burden to enable researchers to concentrate their time on doing the actual research. The Huron Research Suite “software solutions help manage the business of research, driving efficiency and productivity. Flexible, scalable and configurable, our solution streamlines workflow and supports compliance.”<sup>30</sup>

For the grant processes, Huron offers the following benefits; prevents user input errors throughout a sponsored project's lifecycle; accurate timely submissions; standardized institutional and sponsor compliant budget preparation and streamlined proposal preparation and submission specifically for multi-project applications.<sup>31</sup> As prior noted with other systems, for pre-award, management, Huron proposes useful features for managing pre-award processes to increase efficiency and submission of sponsor compliant applications.

#### **2.6.5. Streamlyne**

Streamlyne has similar features as prior reviewed software, the additional feature that was of interest to the author is that the system was built in the cloud which has the

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<sup>29</sup> Cayuse, accessed June 9 2019, <https://cayuse.com/products/>

<sup>30</sup> Huron Consulting Group, Nick Stier, Gary Whitney, Huron Introduces Huron Research Suite: an Integrated, Streamlined Experience, accessed June 9 2019, <https://huronconsultinggroup.com/resources/higher-education/huron-introduces-click-research-suite-8-integrated-streamlined-experience>

<sup>31</sup> Ibid

advantage of access at any time. For small and midsize institutions, Streamlyne offers Pre-Award Lite product for required data to reduce administrative burden. The product allows incremental changes to suit the current need with options to add features as and when the need arises. This product “will take less time to implement, have fewer fields to complete, be simpler to use, and save you a bundle of money!”<sup>32</sup>

Additionally, Pre-Award Lite automates research administration processes including; proposal approvals and consolidation of intake, routing and certification forms.<sup>33</sup> This software is recommended for small and midsize institutions with limited funding to support large software. This software would be attractive to institutions in LMICs due to budgetary constraints some of these institutions face. The fact that it’s cloud-based and also reduces the administrative burden is a bonus.

#### **2.6.6. Research Electronic Data Capture (REDCap)**

The author included a review of REDCap in the literature specifically for purposes of evaluation of software to develop questionnaires and forms for data collection to support specifically pre-award related surveys. REDCap was created in 2004 at Vanderbilt University initially to support “a small group of clinical researchers who needed a secure data collection tool that met HIPAA compliance standards.” This quickly evolved to the formation of collaborative software and in 2006 REDCap consortium was launched to support clinical researchers.<sup>34</sup>

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<sup>32</sup>Streamlyne, Pre-Award Lite, accessed June 9 2019, <https://streamlyne.com/products/preaward-lite/>

<sup>33</sup> Ibid

<sup>34</sup> REDCap, accessed June 9 2019, <https://projectredcap.org/about/>



Through the Assistive Technologies for Research Administration course module, the author learned that REDCap can be used to develop proposal routing intake forms that are instrumental in gathering information from PIs prior to initiating proposal preparation. For example, an intake form in REDCap will be used to gather information from PIs prior to proposal preparation to ensure that all proposals for external funding have been reviewed and approved for institutional and sponsor compliance prior to submission. Such a form will be helpful to the grants management office to assess the volume of potential applications, assess if the proposal meets institutional and sponsor requirements, determine the scientific area of interest and also determine the support that will be required from the office of grants management. Use of the proposal intake routing form will, therefore, be beneficial in streamlining the initial steps in the pre-award cycle. An example of a proposal intake routing form created in REDCap is provided in this paper as *Appendix 1: Proposal Routing Intake Form*. *Link to the form here* <https://www.jhudisc.org/redcap/surveys/?s=EF3LCRMH98>,

## **2.7. Challenges Faced in the Automation of Research Administration Processes**

Migration to electronic management of research administration processes will be faced with challenges which may include computer literacy of the users; user-friendliness of the system, the amount of time to complete forms; layout of the forms and compatibility of systems. The failure or success of a system is dependent on the design. J.A. Bargas-Avila et.al, recommend the following considerations to address in the design of forms

(1) form content, (2) form layout, (3) input types, (4), error handling and (5) form submission. The purpose is to ensure that information requested is relevant,

formatting of the form is attractive to the user, input types designed to minimize errors and restrict answers to encourage form use.<sup>35</sup>

The other main challenge is to find a truly configurable software to automate all the processes. A non-configurable software will be expensive if it can't be customized to accommodate more functions. Therefore the most cost-effective software should be configurable to meet the evolving institutional needs. Most software is expensive and this will impact specifically on research institutions in LMICs where in most cases there's no budget to support such expensive Information Technology (IT) infrastructure and requires a special request to the funder or proposal to the sponsor to support the purchase of the software. This may be a limiting factor to fully migrate to electronic systems. Board *et.al*, acknowledges that software costs are real and at the Northwestern University, it was identified that substantial financial investment was required for the systems initiatives and recognized the need to map the processes and prioritization for a cost-effective successful system.<sup>36</sup>

Tyler Saas and James Kemp in their review of Institutions of Higher Education systems to support research administration functions established that the highest priority for investment is placed on post-award financial management. As a result research administration systems are not fully integrated into the available systems as most vendors will not invest in developing functions in their systems unless demand for those functions

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<sup>35</sup> J.A. Bargas-Avila et.al, Simple but Crucial User Interfaces in the World Wide Web: Introducing 20 Guidelines for Usable Web Form Design, University of Basel, Faculty of Psychology, Department of Cognitive Psychology and Methodology, Switzerland

<sup>36</sup> Board et.al, A New Vision for Research Administrative Systems Research Administrative Systems Working Group Report, North Western University, (November 7, 2013), accessed June 5 2019, <https://www.it.northwestern.edu/bin/docs/cio/new-vision-for-research-administrative-systems-report-110713.pdf>

is significant.<sup>37</sup> Additionally, when institutions evaluate the need for software, most times, priority is to invest in a system to manage financial, Human Resources (HR) and the procurement part of the business. The challenge that arises is that most vendors have less interest in research administration systems which in turn makes such systems expensive.

Tyler Saas et.al also hypothesize in a speculative manner that “few players in the software market understand the business of research administration well enough to develop a robust, fully integrated suite of pre- and post-award tools that meet the needs of IHEs.”<sup>38</sup> It is argued that financial processes have been on the market longer than research administration and that research administration is highly regulated and the regulations may be arcane. Vendors will lack knowledge of the full research lifecycle and may lack the motivation and vision to develop a robust research administration solution.<sup>39</sup>

## **2.8. Applicability of Literature Review.**

The literature reviewed for this project focused on eRA for research administration processes with emphasis on pre-award processes. The intention of the review was to provide information to support the research questions and research objectives. Hence the focus was placed on understanding the history of eRA, the benefits of software, the available systems that are designed to support research administration, unlike other ERP solutions which primarily support finance and HR functions. The

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<sup>37</sup> Tyler Saas, James Kemp, Deloitte Consulting LLP, It Takes an Eco-System: A review of the Research Administration Landscape, Research Management Review, Volume 22, Number 1 (2017)

<sup>38</sup> Ibid

<sup>39</sup> Ibid

literature reviewed was beneficial in understanding how eRA has evolved and contributions of software in streamlining processes and reducing of administrative burden which was essential to support the project.

## **Chapter 3. Need(s) Assessment**

### **3.1. Need(s) Assessment.**

Building capacity to increase grant applications submitted is a major objective of MU-JHU to obtain funds to support research activities and sustainability of research projects at the institution. This is evidenced by the capacity building grants that the institution has been awarded to support training in grants management. The major capacity building grants include the International Extramural Associates Research Development Award (IEARDA) grant awarded to strengthen research, grants writing and management capacity through training to produce a critical mass of professionals and research administrators at MU-JHU and Makerere University School of Medicine and the G11 (G11TW010344) Fogarty grant awarded in 2016 to strengthen research administration capacity at MU-JHU. The latter grant is also supporting the author to complete the Master of Science Degree in Research Administration. These initiatives have improved capacity and skills of research administrators at MU-JHU but the research administration processes have not improved at the same pace and are still manually managed by spreadsheets with no comprehensive software to integrate and streamline the processes.

As a result, when the author pursued the Assistive Technologies for Research Administration course module, it was identified that there's a key role that eRA system plays in streamlining research administration processes e.g. improved quality of applications, transparency, and reduced administrative burden. Additionally, review of software (as indicated in the literature review section of this project) shows evidence that eRA software improves management of research administration processes.

During proposal preparation and submission, MU-JHU has no electronic system to route and approve submissions and no system to internally validate applications to ensure error-free applications are submitted. Observation and assessment of the current Enterprise Resource Planning (ERP) system at MU-JHU was indicative of the gaps in the management of pre-award processes and rationalized that software for pre-award management was essential.

### **3.2. Metrics.**

Navision the ERP solution used at MU-JHU was evaluated and has no pre-award research administration suite and configuration to meet research administration needs. Additionally, grants management was not prioritized when the software was initially installed. A review of existing eRA software was indicative of improved compliance during proposal preparation and reduced administrative burden.

### **3.3. Sources.**

The pre-award phase is an essential phase in the grant cycle, during this phase an institution prepares proposals to compete for funding. Streamlined processes are key for efficient management of pre-award processes. This is an area that the author assessed and identified gaps in the management of these processes at MU-JHU after attending the Assistive Technologies for Research Administration course module. The author shared this challenge with the Instructor for Assistive Technologies for Research Administration, who advised that the identified need was essential for improved grants management. After this initial discussion, the author shared the need with G11 Fogarty Grant Investigators and MU-JHU Senior Leadership who concurred that the institution

would benefit from an eRA system to manage research administration processes and approved the capstone project.

## **Chapter 4. Project Description**

### **4.1. Project Elements.**

Creation of a critical mass of research administration professionals to support research administration at MU-JHU has been an ongoing strategic objective for the institution. As a result, several grants management trainings through the Fogarty IEARDA grant and the G11 Fogarty grant awarded to the institution were specifically to build the capacity of research administrators to ensure good stewardship of sponsor funds, improve research administration management, increase number and quality of proposals submitted. Some of these objectives have been met by the institution but research administration processes specifically pre-award processes still require effective management to achieve significant growth in the number of error-free proposals submitted and also to achieve a reduction in administrative burden related to proposal preparation.

To streamline the processes and alleviate the related administrative burden in the management of research administration functions, grants management software is part of the solution to achieve this. The literature reviewed for this project, therefore, placed emphasis on eRA systems used at US-based IHE due to the fact that they have similar characteristics to research administration processes at MU-JHU. Review of the eRA systems was indicative that electronic software has been instrumental in the reduction of administrative burden and assisted in the submission of error-free applications. Therefore literature review was an essential component in the design of the project.

To garner information and develop a rationale for the project, it was necessary to map pre-award research administration processes at MU-JHU to assess how the



workflow of these activities is managed, identify gaps in the workflow, identify gaps in the ERP system and recommend solutions. Additionally, to assist in the assessment and recommendations of a viable automated system, the author designed a decision matrix to identify and prioritize software key features. Mapping of the research administration processes and the decision matrix would provide critical information to concretely inform decision and recommendations for an eRA grants management system to promote efficiency in the management of MU-JHU's research administration processes.

Implementation and transition to electronic grants management have considerations to note, 1) grant management software is a huge investment requiring funds to achieve; 2) transition and automation of processes require proper change management and acceptability to the users, and; 3) may require a longer timeframe to implement. For these reasons and to ensure that the project is manageable, this project focused on incremental review and recommendations for pre-award research administration processes. The success of this initial phase would lead to expansion of the project to encompass the automation of post-award to closeout research administration processes.

Following an initial review of the pre-award processes, eRA solutions were reviewed to identify the software solutions in existence for grants management. The necessary information to inform the decision for an eRA system was based on a literature review of grants management software and the decision matrix developed by the author.

Finding suitable grants management software would also require engaging vendors with a proven track record for robust grants management solutions. This would be attained by designing a Request for Proposal (RFP) that comprehensively highlights

software requirements. To fully implement the project, a RFP which highlights the features and vendor expectations for an effective eRA system was developed. The RFP will be shared with management to attain institutional buy-in and also be used to evaluate available software options to support pre-award grants management solutions that meet the functional needs of MU-JHU.

The overall intention of the project was to identify gaps in pre-award management specifically the processes that involve proposal preparation as well as streamlining proposal routing and approval processes. This project will be beneficial to MU-JHU to lay the foundation and justification for procuring grants management software to assist research administrators and Investigators to be more efficient with a possible reduction in administrative burden. Completion of the project will include tools to guide implementation including the decision matrix, process mapping flowchart, and RFP.

## **Chapter 5. Methodology**

### **5.1. Methodology Overview.**

A review of the software used at MU-JHU and other research institutions in the same setting led to the observation that most institutions mainly use ERP systems to manage project activities and most of the pre-award activities are paper-based and using disparate systems. ERP systems are favored to support financial management but lack the functionality to adequately support grant management functions such as proposal preparation, routing and approval workflows, error validation during proposal submission and system-to-system proposal submission.

As evidenced in the 2012 FDP survey report 42% of researchers' time is spent on administrative work which impacts on core research activities. Of the 42%, administrative work, about half of this time (21%) is spent on proposal preparation processes.<sup>40</sup> To reduce administrative burden related to managing grants, eRA systems are essential and this project's focus was on the evaluation of the MU-JHU pre-award processes to determine how these processes could be supported by software to improve institutional and sponsor compliance, improve proposal preparation processes and also reduce administrative burden.

Justification for the project involved a review of literature related to eRA systems and grants management software from journals, blogs, and online publications. The literature reviewed provided factual information to support the argument that eRA systems are instrumental in the reduction of the administrative burden as well as essential

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<sup>40</sup> Sandra L. Schneider et.al, Federal Demonstration Partnership (FDP), 2012 Faculty Workload Survey, Released: April 2014, accessed June 13 2019

in creating transparency and accountability in pre-award management. The review focused on solutions specific to grants management e.g. Kuali, Cayuse, InfoEd, and Streamlyne.

The author also mapped pre-award research administration processes at MU-JHU to examine how the processes are managed and also assess how the institution would improve research administration management through utilization of eRA systems. A decision matrix, a routing proposal submission flowchart, and RFP were designed to inform the decision for implementation of the project. The project concluded with recommendations for management review.

## **5.2. Project Design and Discussion.**

### **5.2.1. Mapping MU-JHU Pre-award Research Administration Processes**

The research continuum includes the pre-award, award, post-award, and closeout phases but the focus for the project was pre-award research administration processes. Process mapping of the pre-award processes was an opportunity to gain an understanding of the different activities that constitute pre-award processes, determine the volume of work associated with these activities, turnaround time to accomplish the tasks and the functional requirements to implement grants management software.

The Pre-award research administration processes at MU-JHU were reviewed and are highlighted in the table below;

**Table 1: MU-JHU Pre-award Research Administration Processes<sup>41</sup>**

<b>Process</b>	<b>Activities</b>
Find the relevant Funding Opportunity Announcement ( FOA)	<ul style="list-style-type: none"> <li>▪ Explore search engines for grants e.g. Grants.gov, Foundation sites</li> <li>▪ Review FOA application due dates, relevance to institutional objectives and eligibility criteria</li> <li>▪ If relevant and institution is eligible, circulate FOA to PIs</li> <li>▪ Review FOA for sponsor requirements</li> <li>▪ Create a checklist of requirements – <b>Appendix 4: Grants Writing Task Schedule</b></li> </ul>
Create a proposal writing team	<ul style="list-style-type: none"> <li>▪ With input from management, a lead PI is selected as the focal person to lead the proposal writing process</li> <li>▪ Inception proposal writing meeting initiated</li> <li>▪ Using the <b>Grants Writing Task Schedule</b> (Appendix:4), roles are assigned and timelines for drafts are set</li> <li>▪ Drafts developed and reviewed</li> <li>▪ Proposal preparation tracked with the checklist</li> </ul>
Proposal Submission	<ul style="list-style-type: none"> <li>▪ Final drafts collated and uploaded to the submission portal</li> <li>▪ Proposal validation to check for common errors using the agency submission portal</li> <li>▪ Proposal submitted by the institution's Signing Official (SO)</li> <li>▪ Errors corrected if received</li> <li>▪ Submission completed</li> <li>▪ Tracking of the application by PI in eRA Commons</li> <li>▪ Just In Time information prepared if requested</li> <li>▪ Review of NOA if the award is received</li> </ul>

<sup>41</sup> Source Judith Mbanza, Table 1: MU-JHU Pre-award Research Administration Processes

The pre-award processes described in Table 1 were mapped and it was observed that all the processes are manually managed using spreadsheets and email and there's no formal coordinated process for pre-award management. The institution has no software for electronic approval and routing of proposal preparation processes. The concern with routing processes manually e.g. via email has risk exposures which may include losing this information if it ends up in junk mail and may also lead to redundant information. Support of this workflow would benefit from an electronic, web-based portal that supports routing of this workflow.

It would also be beneficial to electronically route the approval of proposals and submission to ensure that all proposals are reviewed for compliance prior to submission. This would be a key feature in the software to enable automated signatures and approvals as well as automated notifications in an easy to follow work queue.

Additionally, the institution currently reviews and validates proposal paperwork offline and there's no error validation software prior to submission of proposals which puts pressure on the grants administration office when agency systems errors are received after submission. Correction of errors prior to submission reduces time spent on submission of proposals and improves the quality of the proposal. Through a review of the literature on eRA systems e.g. InfoEd research administration suite was indicative that the software validates and identifies errors prior to submission. Additionally, the reviewed eRA systems have S2S features which reduce workload and duplication of effort through pre-population of some sections during proposal preparation. Proposal preparation is tedious and though the workload is necessary, software to simplify and organize the process is essential.

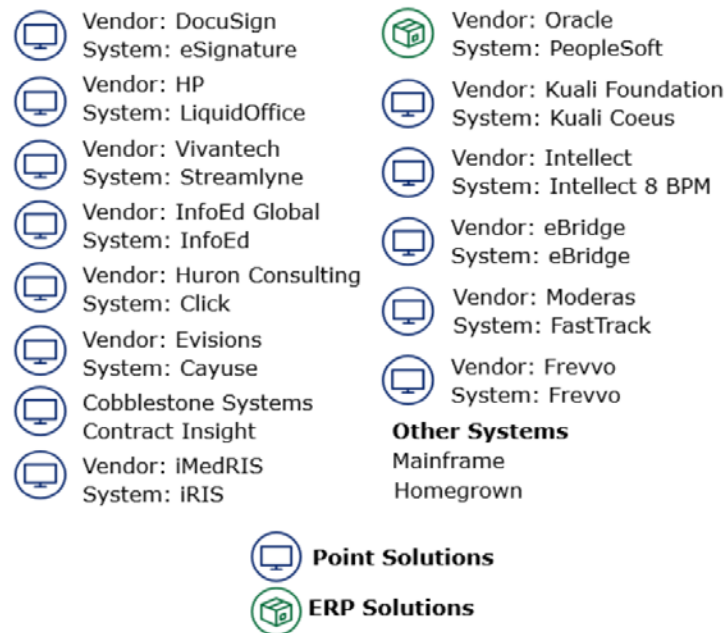
Overall, the review of the processes indicated that routing and workflow of these processes were fragmented which complicated management of activities and as a result increased the administrative burden in coordinating related activities separately. The literature review indicated that managing research administration processes with electronic software goes a long way in simplifying processes and allowed research administrators to offer quality services to PIs and researchers. This project explored the automation of pre-award research administration processes and ways in which grants management software will improve grants management.

### **5.2.2. Collection of Information and Data on eRA Systems**

Review of literature guided the project and provided the requisite information to assess eRA systems. Needs assessment and identification of information pertinent to support the project was through an extensive review of the available literature related to eRA software and how software contributes to the efficient management of research administration processes. The review was helpful in guiding the author to develop a decision matrix that would serve as a guiding tool for eventual recommendations and implementation of the project if funds are available to procure the software. The collection of publications reviewed were indicative of the fact that many US-based institutions have automated management of pre-award and post-award grant processes.

The use of software for research administration at IHEs in the US is summarized by Tyler Saas et.al in Figure 2: Tyler Saas Pre-Award Research Systems.

**Figure 2. Tyler Saas Pre-Award Research Systems<sup>42</sup>**



This summary indicated that 61% of the IHE mainly use Kuali (20%), Cayuse (19%), InfoEd (11%) and Huron (5%). The other institutions either built their own systems (8%) or still rely on manual processes (13%) and some institutions use multiple pre-award systems.<sup>43</sup> Recommendations to bring the project to completion would involve a thorough analysis and evaluation of grants management software which made literature review a pertinent component of the project.

### 5.2.3. System Feature Ranking Decision Matrix

Institutions have varying needs and it is imperative that the grants management software is both functional and cost-effective. Implementation of the project will require input from key stakeholders and decision will be based on the best cost-effective

<sup>42</sup> Tyler Saas, James Kemp, Deloitte Consulting LLP, It Takes an Eco-System: A review of the Research Administration Landscape, Research Management Review, Volume 22, Number 1 (2017)



software. To achieve this objective a system feature ranking decision matrix which encompasses a listing of the key features was designed as indicated below.

**Figure 3. System Feature Ranking Decision Matrix<sup>44</sup>**

System features	Weight Ranking
Proposal review	3
Proposal routing & signoff	3
Access rights	3
Security features	3
Information integration	3
Email notifications	3
Systems generated reports	2
Exporting information to different applications for analysis	1
Access to generic documents	2
Access to budget information for proposals	3
Direct uploading of application in the system	3
Error checks & validation of application documents	3
Submission routing & signoff	3
Verification of submissions	3
Status tracking of submissions	3
Training modules	1
Links to external information	1
Tracking of submitted grants	1

This matrix will serve as a guide to MU-JHU management on the appropriate system required to support pre-award processes, create buy-in and motivate management to purchase the appropriate cost-effective software. The criteria in the matrix placed emphasis on proposal preparation processes, workflow routing, and approvals and general pre-award management.

The matrix was used by the author to rank the software features on a scale of 1 – 3. Features with a score of 3 and 2 were primarily selected considering the essential features that are thought to improve compliance, reduce time spent on

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<sup>44</sup> Source Judith Mbanza, Figure 3. System Feature Ranking Decision Matrix

completing the task and lead to the potential success of submitted grants. The matrix was used to identify the desired system features to support pre-award research administration processes and each criterion was weighted to ensure that an informed decision is made by management on the best pre-award grants management system.

#### **5.2.4. Develop Request for Proposal (RFP)**

Implementation of the project will require a detailed RFP to share with software vendors. The objective of the RFP is to provide a background to the institution grants transactions; details of research administration requirements and features to be incorporated in the system for a robust eRA system. The RFP will be a guiding tool to the vendors as they propose the best solution for MU-JHU building on the features highlighted in the decision matrix. Major sections in the RFP include the project goals with clearly defined expectations, description of the relevant stakeholders, the overall scope of the product, services desired and a detailed description of the eRA features.

The details of the RFP are defined in *Table 2 below*:

**Table 2: Request for Proposal (RFP)<sup>45</sup>**

<b>OBJECTIVE</b>	The objective of this Request For Proposal (RFP) is to provide a background to the institution; provide details of the research administration processes and request proposal for a robust eRA system.
<b>BACKGROUND OF THE INSTITUTION</b>	MU-JHU Care Ltd (the institution) is a collaboration established in 1988 between Makerere University (a local Ugandan University) and Johns Hopkins University (a US-based University). The primary objective of the collaboration is to improve the health status of families infected and affected by HIV/AIDS through research, training, prevention, and care. MU-JHU's research portfolio currently involves several network and non-network studies.
<b>EXISTING SYSTEM</b>	Navision is the software utilized to manage finance, procurement and inventory management functions. MU-JHU has been operating with Navision as the primary software solution to support the vast number of financial and procurement processes. This system was implemented about 6 years ago. However, this system does not include the full scope of functionality and is missing critical modules for grants management for the full cycle from pre-award to post-award research administration functions.
<b>PURPOSE</b>	The intent of the Request for Proposal (RFP) is to purchase grants management software to support pre-award management. This RFP states the overall scope of products and services desired, as well as the desired vendor qualifications.
<b>PROJECT GOALS</b>	The goals for this project is a research electronic Research Administration (eRA) system that enables researchers to create funding proposals, route them electronically for approval, and submit them directly to the funding agency. The system should be user-friendly, with adequate features to support proposal preparation, routing, approval of proposals and submission. This system should be customizable for future additional functions.
<b>GRANTS MANAGEMENT OFFICE RESPONSIBILITIES</b>	The grants administration and management department at the institution is supported by the following teams; <ul style="list-style-type: none"> <li>- Grants and Administration – responsibilities include logistical support during the submission of grants and</li> </ul>

<sup>45</sup> Source Judith Mbanza, Table 2: Request for Proposal (RFP)

	<p>follow-up post-award activities including centralized filing system and tracking of reporting timelines.</p> <ul style="list-style-type: none"> <li>- Finance – responsibilities include budget development during proposal writing, budget monitoring, and reporting</li> <li>- Regulatory – responsibilities include processing IRB approvals, developing Standard Operating Procedures (SOPs) and compliance training</li> <li>- Human Resources - responsibilities include effort reporting, preparing of consultancy agreements and human resource policies</li> <li>- IT – responsibilities include managing systems security and password management</li> <li>- MU-JHU Site Leadership – offering oversight to MU-JHU’s research portfolio and sourcing for funds</li> </ul>
<b>TARGET AUDIENCE</b>	The grants management team which includes research administrators, finance and budget analysts, Director for Administration & Finance, Authorized Organization Representative (AOR) and Principal Investigators (PIs)
<b>SCOPE OF WORK AND DELIVERABLES</b>	<p>This RFP is for the supply, implementation, and support of a research administration eRA system for standardization and improvement of proposal preparation and approval processes at the institution. Specifics of the scope of work are as follows:</p> <ul style="list-style-type: none"> <li>- Supply, implementation, and support of an eRA system that covers the scope of proposal preparation, routing, approval, and submission of proposals</li> <li>- The implementer is expected to provide suitable standard infrastructure to support the transactions of the grants administration and management department at the institution which is an important part of the evaluation of this RFP</li> <li>- A project plan is essential to ensure seamless implementation of the project. The project work plan should include deliverable timelines and project manager for accountability purposes.</li> <li>- Training that includes functional and technical training of the relevant staff should be clearly documented to ensure project implementation is user-centric to improve usability and functionality of the eRA system.</li> <li>- Project testing and commissioning of the project.</li> </ul>
<b>DETAILED DESCRIPTION OF THE PROPOSED ERA FEATURES</b>	<p>The following features are required;</p> <ul style="list-style-type: none"> <li>- Systems security and access rights to ensure that user rights are restricted and password security with role-based levels.</li> <li>- Information integration for quick information retrieval</li> </ul>

	<ul style="list-style-type: none"> <li>- System repository for generic documents.</li> <li>- Communication and systems notifications</li> <li>- Proposal error validations and checks</li> <li>- Proposal routing and approval prior to submission.</li> <li>- Verification and status tracking features after an application is submitted</li> </ul>
<b>ADDITIONAL FEATURES</b>	<p>An added advantage is software that includes the following:</p> <ul style="list-style-type: none"> <li>- Training modules with an intuitive interface and an easy learning curve to facilitate rapid adoption and minimize the need for external, on-going training services.</li> <li>- Links to external information e.g. grant application resources.</li> <li>- Exporting information to other applications for analysis i.e. from system to excel applications</li> </ul>
<b>OTHER KEY ELEMENTS OF THE SYSTEM</b>	<ul style="list-style-type: none"> <li>- The system/software must be compatible with the institution's technology strategic plans.</li> <li>- The system should be a solution that has been successfully implemented recently in an institution with similar transactions and operation (tested and tried system)</li> <li>- The solution must align with the functional requirements as defined in this RFP</li> <li>- Single sign-on feature</li> </ul>
<b>TECHNICAL REQUIREMENTS</b>	<ul style="list-style-type: none"> <li>- Rules-based workflow routing for review by internal reviewers in sequential order and external notification via email as the preferred approach.</li> <li>- Rules-based workflow routing that can be concurrent or consecutive with electronic signatures and visibility to workflow status and approval queue.</li> <li>- Activity or date triggered alerts, flags, and messages to the persons central to the approval and submission of proposals</li> <li>- Audit Trail with user, date, time stamp throughout all modules</li> <li>- Collaborative functions</li> </ul>
<b>CRITERIA FOR SELECTION</b>	<p>The institution has developed a decision matrix to determine crucial system features that the implementer should consider. The desired features are indicated in the following decision matrix and are weighted as follows 1- Optional; 2- Want; 3- Must have.</p>

	<table><tr><th>System features</th><th>Weight Ranking</th></tr><tr><td>Proposal review</td><td>3</td></tr><tr><td>Proposal routing &amp; signoff</td><td>3</td></tr><tr><td>Access rights</td><td>3</td></tr><tr><td>Security features</td><td>3</td></tr><tr><td>Information integration</td><td>3</td></tr><tr><td>Email notifications</td><td>3</td></tr><tr><td>Systems generated reports</td><td>2</td></tr><tr><td>Exporting information to different applications for analysis</td><td>1</td></tr><tr><td>Access to generic documents</td><td>2</td></tr><tr><td>Access to budget information for proposals</td><td>3</td></tr><tr><td>Direct uploading of application in the system</td><td>3</td></tr><tr><td>Error checks &amp; validation of application documents</td><td>3</td></tr><tr><td>Submission routing &amp; signoff</td><td>3</td></tr><tr><td>Verification of submissions</td><td>3</td></tr><tr><td>Status tracking of submissions</td><td>3</td></tr><tr><td>Training modules</td><td>1</td></tr><tr><td>Links to external information</td><td>1</td></tr><tr><td>Tracking of submitted grants</td><td>1</td></tr></table> <p>The features with a value of 3 are critical to the proposed system and are a “must have” and the implementer should take this into consideration. Whereas the features with a value of 2 are listed as “wants”, and those with a value of 1 are on the wish list.</p> <p>Overall the features listed in the decision matrix will be evaluated by a review committee consisting of various process owners at the institution to acquire a solution that provides the best value to the institution and meets or exceeds both the functional and technical requirements identified in this RFP.</p>	System features	Weight Ranking	Proposal review	3	Proposal routing & signoff	3	Access rights	3	Security features	3	Information integration	3	Email notifications	3	Systems generated reports	2	Exporting information to different applications for analysis	1	Access to generic documents	2	Access to budget information for proposals	3	Direct uploading of application in the system	3	Error checks & validation of application documents	3	Submission routing & signoff	3	Verification of submissions	3	Status tracking of submissions	3	Training modules	1	Links to external information	1	Tracking of submitted grants	1
System features	Weight Ranking																																						
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Training modules	1																																						
Links to external information	1																																						
Tracking of submitted grants	1																																						
<b>MINIMUM REQUIREMENTS</b>	<p>The institution will require the implementer to meet the specifications, criteria and terms and conditions in the RFP. Failure to meet all of these criteria will automatically disqualify the implementer’s response from further consideration.</p>																																						

The RFP in addition to the decision matrix will be essential tools to implement the project and ensuring that transparent processes are followed to select the vendor with the appropriate solution tailored to MU-JHU’s functional needs.

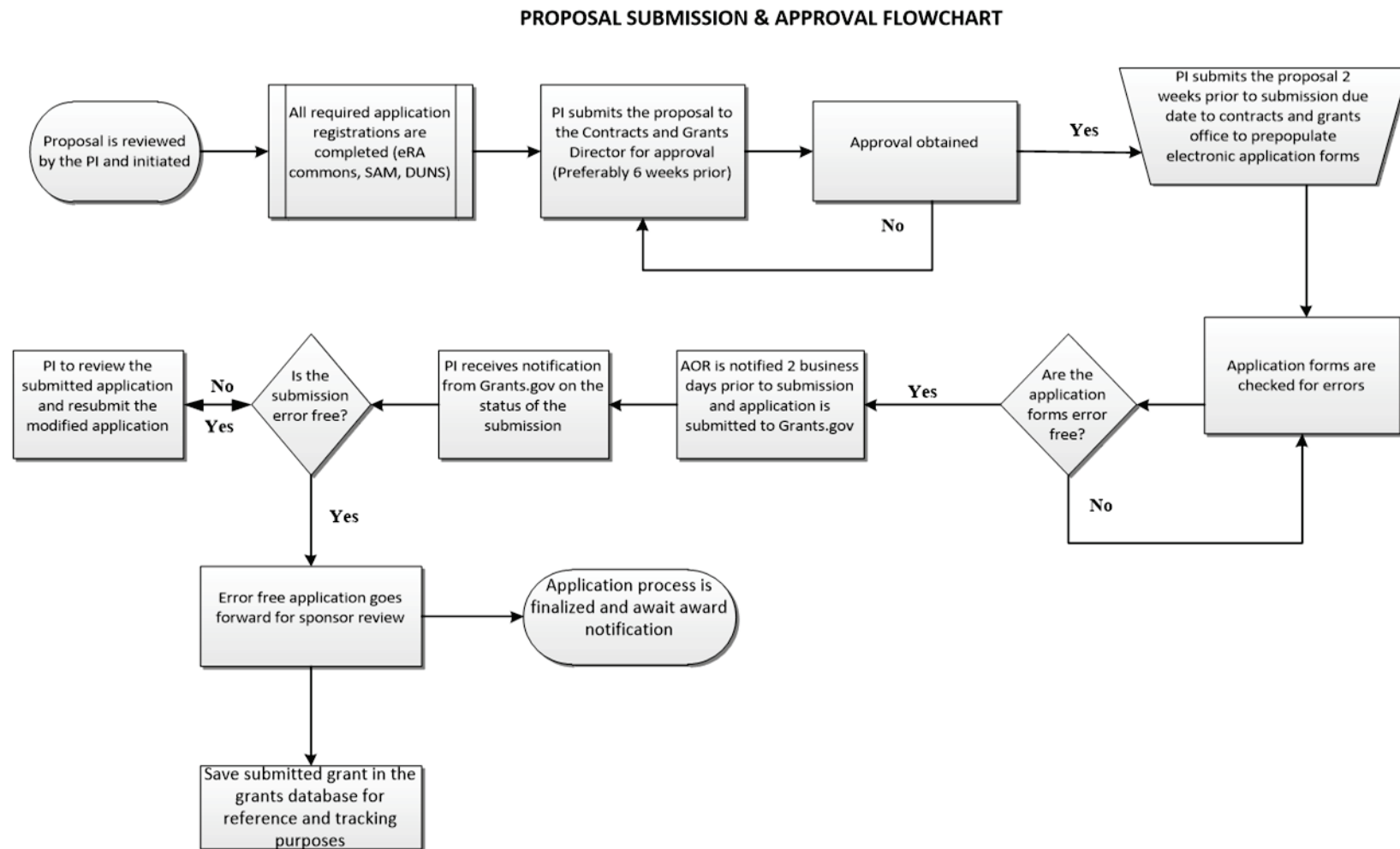
## **Chapter 6. Project Results and Discussion**

### **6.1. Project Result 1. Outcomes of Process Mapping**

Through process mapping of the research administration processes at MU-JHU, it was established that the proposal preparation and submission processes lacked a concrete automated routing and approval process. A proposal submission and approval flowchart was developed to highlight the pre-award workflow requirements for enhanced transparency and accountability. The process owners for the flowchart will include the Principal Investigators, Institutional Officials, and Research Administrators.

To fully examine research administration processes at MU-JHU, it was pertinent to analyze the processes, the different components of the process, the responsible person/s and how the processes logically flowed. Electronic routing of this workflow would enhance accountability and improve efficiency prior to and during proposal preparation. The pertinent steps in the flowchart included; proposal initiation by the PI, required registrations, steps to ensure the proposal is approved prior to submission, review of the application to ensure compliance and also examined the processes after the grant is submitted. The chart with detail of the processes is illustrated on the following page.

**Figure 4: Proposal Submission and Approval Flowchart<sup>46</sup>**

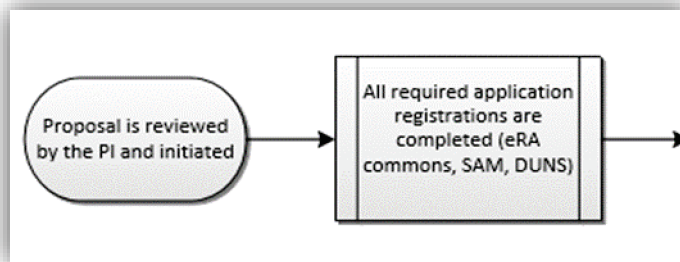


<sup>46</sup> Source Judith Mbanza, Figure 4: Proposal Submission and Approval Flowchart



The processes in the flowchart are summarized and described with screenshots as follows; the starting point in the flowchart is proposal initiation followed by predefined steps which include institution registrations e.g. Grants.gov, eRA Commons and SAM registration as indicated in the following screenshot from the flowchart.

**Figure 4.1: Proposal Initiation**<sup>47</sup>



For purposes of compliance and action, the research administration office should be notified when PIs intend to submit proposals to ensure that institutional and sponsor compliance requirements are met. The other key detail to note for proposal submission requires that applicable registrations are current e.g. System for Award Management (SAM) registration which is a requirement for institutions to apply for federal funds. The grants management software should integrate this information and contain systems notifications when expiry dates are due for timely renewals. For a consistent and timely response, the aforementioned should be routed electronically and essential to include in the grants management software.

Proposal routing and approval was a major gap in the processes and yet approvals are necessary to ensure that prior approval is obtained from the authorizing office before

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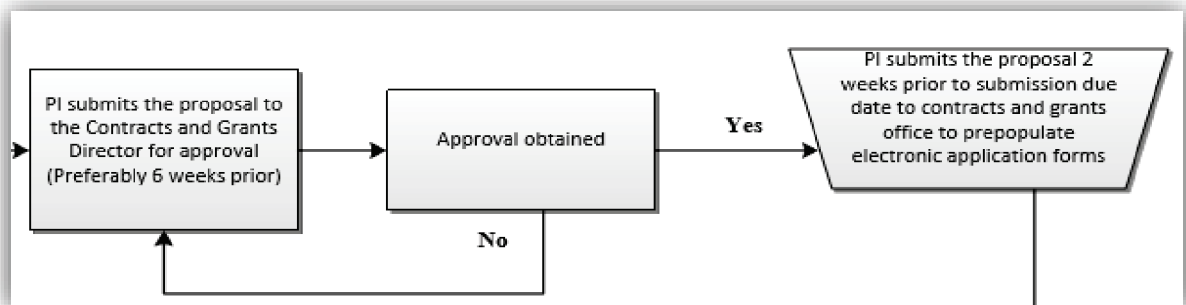
<sup>47</sup> Source Judith Mbanza, Figure 4.1: Proposal Initiation

submission to ensure that the grant proposal is compliant. This process would be potentially configured in the software to allow the Contracts and Grants Director (the approver) to verify and certify the following:

- Principal Investigator eligibility
- Verification that the proposed project is consistent with the educational or research objectives of the institution and the objectives of the sponsor
- Ensuring that the project scope of work is consistent with internal institutional policies, sponsor terms, and conditions
- Institutional commitment to the proposed project in terms of financial resources, space, equipment, human resources and researcher time

The software would also be utilized to set timelines to ensure that proposal preparation timelines are met and sponsor due application deadlines are also met. The figure below illustrates how this process should flow.

**Figure 4.2: Proposal Timelines<sup>48</sup>**



Turnaround times are a major challenge and meeting submission deadlines is a continued challenge which impacts on the quality of the proposal and places pressure on

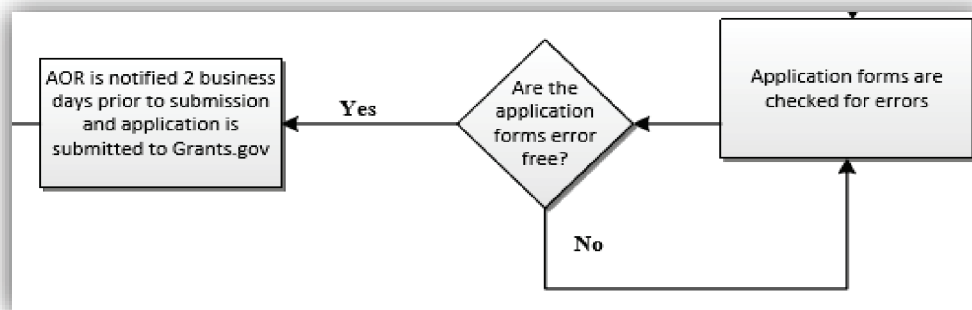
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<sup>48</sup> Source Judith Mbanza, Figure 4.2: Proposal Timelines

the grants management office. Setting the procedures and timelines right will enable the grants office to offer better support to the proposal preparation team and timeliness in proposal submissions. Incorporating notifications for proposal timelines and due dates in the software will go a long way in alleviating this challenge.

The other step in the flowchart is error validation which should be an essential feature in the system. Process routing should ensure that the relevant office/s is informed in a timely manner. Most of the institution's submissions are through Grants.gov portal and the recommendation is to route the application to the AOR 2 days prior to the due application date. The software would support this process through systems generated email notifications as illustrated in figure below.

**Figure 4.3: Error Validation<sup>49</sup>**

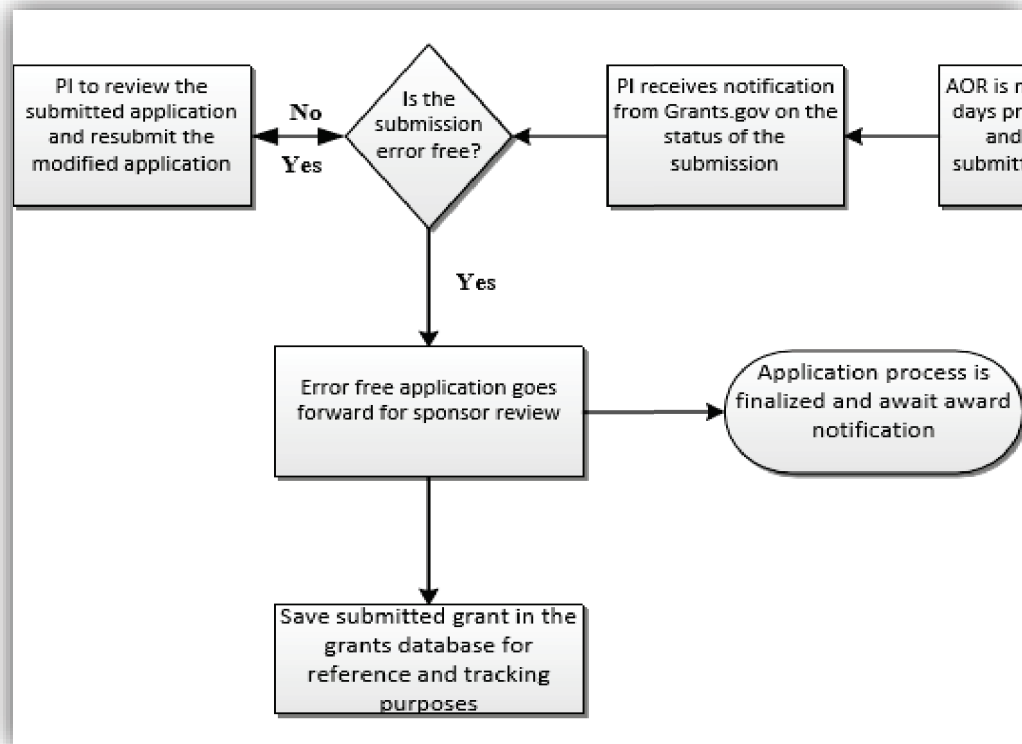


There are processes after submission to follow such as PI requirement to login in eRA Commons to view the assembled application for any errors or warnings. An application must be error-free to complete the electronic submission process. The Figure 4.4: Post Submission Processes illustrates this process.

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<sup>49</sup> Source Judith Mbanza, Figure 4.3: Error Validation

**Figure 4.4: Post Submission Processes<sup>50</sup>**



Process mapping of proposal preparation in this project was to ensure that compliance is maintained through the entire process from proposal initiation to proposal submission. The ultimate goal or output from following the steps in the flowchart will lead to sponsor and institutional compliant submissions thus improving the quality of grants submitted. The electronic flow of the process in the described flow chart will enable research administrators to be aware of the workload and better plan through knowledge of the approved proposals for submission, ensure that proposals are checked for errors electronically and increase opportunities for submission of error-free applications in a timely manner.

<sup>50</sup> Source Judith Mbanza, Figure 4.4: Post Submission Processes

## **6.2. Project Result 2. Outcome of Review of the Key System Features**

To identify a functional system, it was necessary to review research administration processes and analyze the appropriate system features to comprehensively support pre-award research administration processes. To support this evaluation and analysis, a decision matrix was designed to assess systems features, rank them in accordance to value and importance and also provide a basis for recommendations. The features and priority ranking are indicated in the decision matrix on the next page.

**Figure 5: Decision Matrix<sup>51</sup>**

Decision Matrix: Proposal/Submission System				
System features	Weight Ranking	System A	System B	Build (Current system)
Proposal review	3	3	3	0
Proposal routing & signoff	3	3	3	0
Access rights	3	3	3	2
Security features	3	2	3	2
Information integration	3	3	2	1
Email notifications	3	3	3	0
Systems generated reports	2	3	3	1
Exporting information to different applications for analysis	1	3	3	0
Access to generic documents	2	3	3	0
Access to budget information for proposals	3	3	3	0
Direct uploading of application in the system	3	3	3	0
Error checks & validation of application documents	3	3	3	0
Submission routing & signoff	3	3	3	0
Verification of submissions	3	3	3	0
Status tracking of submissions	3	3	2	0
Training modules	1	3	3	0
Links to external information	1	3	3	0
Tracking of submitted grants	1	3	0	0
	<b>Total</b>	53	49	6
	<b>Weighted Total</b>	129	123	17
<b>System Ranking: 0 - 3</b>				
0 - Unknown or N/A				
1 - Unsatisfactory				
2 - Satisfactory				
3 - Meets criteria				
<b>Evaluated Systems</b>				
System A: InfoEd Global				
System B: Kuali Coeus				
System Build : Navision				
<b>Weighted Ranking</b>				
1 - Optional				
2 - Want				
3 - Must have				
<b>Decision</b>				
The decision based on both the <b>total and weighted total score</b> recommends a review of the best two software, <b>InfoEd Global</b> and <b>Kuali Coeus system</b> but also recommend that a consultant is engaged to advise on the available eRA systems. The current institutional system is still lacking various functions required to support proposal preparation and submission processes and would be costly and time consuming to build and customize. Buying a new system with the desired functions would be more cost effective and efficient.				

<sup>51</sup> Source Judith Mbanza, Figure 5: Decision Matrix

The justification for the features in the matrix was on the basis of those features that would facilitate research administrators to deliver quality service to PIs and researchers. The features ranked 3 were a “must have” followed by those ranked at 2 which were “wants” and those ranked at 1 were optional as per the decision matrix.

#### **6.2.1. Brief Description of the Decision Matrix Features**

For example, version control feature in an eRA system is essential during proposal review to ensure that correct versions are reviewed prior to submission and hence error reduction. Electronic proposal routing and sign off prior to submission of proposals is also important to promote transparency, accountability, and tracking of a proposal to ensure institutional and sponsor compliant submissions.

The other important feature for consideration was information integration during proposal preparation to ease information retrieval. For example, during proposal preparation, budget development is a tedious and time-consuming process and likely to attract most of the errors in an application. The advantages of an integrated system include reduced time spent on developing budgets. This can be attained if the software supports retrieval of information from the payroll or human resources records and prepopulates the information directly system-to-system. Additionally, a feature in the system which prepopulates generic documents and information in the proposal would help research administrators reduce administrative burden.

Submission of error-free applications increases opportunities for success. The software to appropriately address this challenge is software with error validation

features prior to submission. During the development of the decision matrix, this was identified as a key feature to support the institution's mission to submit more error-free grant applications and would be crucial to alleviate the issue of systems generated errors when a grant is submitted for example through Grants.gov.

Furthermore, errors could be minimized if the proposal goes through the submission approval process by the designated official prior to submission. Submissions routed through this process will be evaluated for compliance and errors prior to submission, this feature is a must-have in the eRA system.

Proposal preparation is usually a team effort and coordination of the process may be complicated if communication channels are not clearly defined. In developing the decision matrix, it was considered crucial to incorporate in the system features that would notify key stakeholders when a proposal is routed for approval and signoff. This feature would be beneficial to interact with individuals in different locations and reduce the time spent on calls and physical movement which is characteristic of a paper-based system.

Other metrics considered essential in a robust eRA system was systems security and access rights. Password security and role-based access would promote transparency, accountability and systems monitoring. Ranking of features would be instrumental when reviewing available systems and important to guide recommendations.



## **Chapter 7. Recommendations and Discussion**

### **7.1. Introduction**

The review of the pre-award processes was an eye-opener to the limitations in the ERP system as well as the gaps in pre-award grants management at MU-JHU. The literature review led to the realization that efficient grants management requires software to manage complex research administration activities. However, implementation of grants management software is a huge investment which requires financial resources, the involvement of key stakeholders and institutional buy-in. To effectively manage change processes requires thorough analysis and review of the need and ensuring that this is aligned with organizational objectives. This project lays the foundation, justification, and advocacy for improved pre-award grants management at MU-JHU through the purchasing and installation of a robust eRA system to automate processes and creation of transparent workflows.

### **7.2. Recommendations**

#### **7.2.1. Recommendation 1. Stakeholders Must Be Involved in the Selection Process**

Effective change management is a concerted effort. To implement this project, it will be important that all key and relevant stakeholders are involved in the selection of the system. Creation of a functional and user-friendly system is essential for usability of the software. This will be a key step in the implementation of the project for purposes of ensuring that the system is tailored to the needs of the user, relevant to the process and does not create unnecessary layers of complexities.

### **7.2.2. Recommendation 1. Hire a Resident Software Coordinator to Support Software Implementation Processes**

A decision matrix was developed for the project by the author. However, to fully prioritize needs vs. wants, it will be important to hire a software coordinator to lead the project and work with the selected vendor in determining MU-JHU's functional requirements to ensure that the system is configured to meet the needs of MU-JHU.

Implementation of the selected software will be a huge shift in operations and to manage change related anxiety requires the input of an institution based software coordinator to address people and process issues. The key stakeholders need to be involved in the process to help them embrace change.

The Software Coordinator will be the resident expert in the field. Additionally, the Coordinator will review current processes and advise on the best solution with a proven track record to aid in concretizing recommendations.

### **7.2.3. Recommendation 3. Create and Submit a Grant Application to Relevant Sponsor in order to Finance the Purchase, Installation, and Upgrades of the New Software**

Software purchases, installations, and upgrades are expensive. This is a challenge to institutions reliant on donor funds and with no specific budget for infrastructural upgrades. Due to the cost implications of implementing the software project, it's recommended to submit an administrative infrastructure supplement to fund the project. MU-JHU has previously submitted and awarded administrative supplements which have greatly supported the institution to procure large equipment and supported renovations to clinic facilities. To fully implement and roll out this project to include the entire research

administration spectrum of activities requires special funding which will be attained if a supplement for this project is submitted and awarded.

#### **7.2.4. Recommendation 4. Design Software Specific RFP**

A market survey of available grants management software is essential to ensure that the software procured is suitable for the needs of the institution with a note that functional needs may differ from one institution to another. To meet this need, an RFP has been developed for further review by leadership. The Software Coordinator will be hired to review and coordinate the review of the software presented in this paper. He/She will also make sure that the software meets the needs of the institution as described in Figure 5: Decision Matrix. In summary, the RFP includes project objectives, vendor requirements, software requirements, implementation, and customer support details.

Knowledge of available software will be a starting point as indicated in the literature review *section 2.6*, which reviews several grants management software. The blog post “6 Questions to Ask When Evaluating Grants Management Systems” summarizes the most common grants management systems which are a helpful summary of software in addition to the literature review to assess suitable software as indicated in Table below.

**Table 3:** Grants Management Systems<sup>52</sup>

<b>Product</b>	<b>Description</b>
Cayuse Grants	Cloud-based Grants Management solution with pre- and post-award support in one system. Additional Cayuse 424 product supports fast, accurate completion and submission of federal grant proposals.

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<sup>52</sup> 6 Questions to Ask When Evaluating Grants Management Systems, accessed July 4 2019  
<https://www.badrabbit.com/news/2019/2/18/evaluating-grants-management-systems>

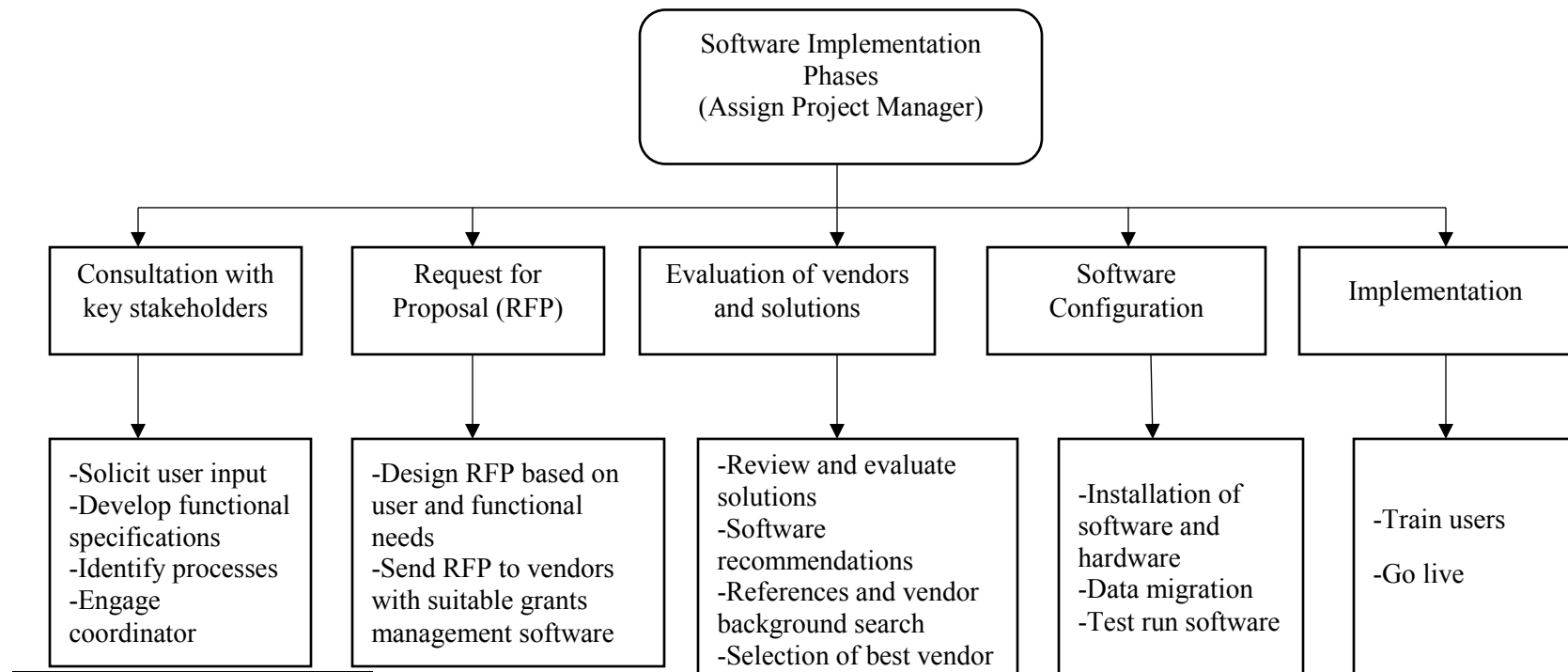
Huron Grants	Robust, customizable system with system-to-system proposal submission, post-award features, and integration capabilities.
InfoEd Grants & Contracts	Includes system-to-system submissions and strong customer support. Funding Search, Pre-Award, and Post-Award solutions can be used independently or as a cohesive whole.
Key Solutions eGrants Module	Prepare grants applications, route them for internal approvals, and submit to funding agencies from within a single platform. Online platform supports S2S, sub-award funding, and post-award budget management.
Kuali Research	Cloud-based, open source software supports pre- and post-award management, S2S submissions, and integrations with financial systems
SmartGrant	Cloud-based RA software with modules for Pre-Award, Electronic Routing, S2S, Post-Award, and Advanced Reporting.
Streamlyne Research	Cloud-based, integrated modules include pre-award support with system-to-system capabilities and post-award module to track and maintain funded awards

### 7.2.5. Recommendation 5. Project Work plan and Phases

For successful implementation of the project, a project manager should be assigned and an implementation plan created.

Below is the proposed implementation plan.

**Figure 6: Software Implementation Phases<sup>53</sup>**



<sup>53</sup> Source Judith Mbanza, Figure 6: Software Implementation Phases

### **7.2.6. Recommendation 6. Short-term Solutions to Manage Pre-award Functions Prior to Long-term Software Project Implementation**

Due to resource constraints, implementation of the software project won't be immediate including the need to obtain alternative sources of funding such as submission of application to relevant funding agencies. It's therefore essential to explore alternative short-term solutions to manage pre-award functions in more efficient ways prior to long-term project implementation. One of the ways is the implementation of recommendations described in the flowchart Figure 4: Proposal Submission and Approval Flowchart<sup>54</sup> which highlights the pre-award workflow processes with the intention to create transparent workflows for proposal preparation routing and approvals of submissions. Though this will be managed manually, it is a prototype for eventual electronic migration.

Additionally, it should be examined whether the current ERP Navision system can be customized to accommodate some of the grants management needs. This has been a work in progress and so far post-award tracking of grants has a module configured to support this function. With support and guidance from the vendor, explore other research administration functions that the ERP system can accommodate as plans to implement grants specific software are evaluated.

Develop grants specific SOPs and policies that are readily accessible and grants toolkits to ensure that compliance is maintained for both pre-award and post-award processes. The grants management team with support from other research team members supported by the G11 Fogarty grant are developing a research administration handbook.

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<sup>54</sup> Source Judith Mbanza, Figure 4: Proposal Submission and Approval Flowchart

This handbook encompasses pre-award and post-award guidelines and compliance related literature. The plan for the handbook has involved training based on chapters developed and this has been a great opportunity to educate the research teams on the pre-award and post-award institution and sponsor requirements. Building on this initiative, more SOPs should be developed to concretize and emphasize process requirements with the research teams.

## **Chapter 8. Conclusion**

This project made it evident that grants management software is important for streamlined and transparent research administration in a research institution. Grants management software creates a platform that enables researchers to spend more time delivering on the core mission of research as well as strategic positioning to win awards. Proposal preparation is the lifeline for research institutions and software to support this process ensures that the complexities associated with this process are alleviated.

Grants management software as established through literature review has several advantages including but not limited to; enabling research administrators to validate and check errors in proposals prior to submission, integration of grants information and S2S support which eliminates redundancy in working with one system and routing and submitting on a separate system.

However, much as grants management software is important in the preparation of proposals, a key factor to remember is that early preparation and submission are equally important. There are some limitations with software due to unexpected circumstances that could delay a submission. Murphy's Law which states that "anything that can go wrong will go wrong" has never been truer when applied to proposal preparation. Internet connectivity may be lost, documents intended for submission may be erroneously deleted and yet submission due dates are hard and fast. Grants management software will save time spent on preparing proposals but early preparation and submission will save researchers from anxiety and pressure related to proposal preparation and submission. A combination of the two factors – grants management software and early preparation is the perfect recipe for efficient pre-award grants management.



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## Appendices

### Appendix 1: Proposal Routing Intake Form<sup>55</sup>

Link to Proposal Routing Form in RedCap:

<https://www.jhudisc.org/redcap/surveys/?s=EF3LCRMH98>

Please complete the information in the form to help us ensure that all proposals for external funding have been reviewed and approved for institutional and sponsor compliance prior to submission.

Thank you!

<b>Designation</b> * must provide value	<input type="text"/> PI, Co-Investigator, other contributor
<b>Title of the proposed project</b> * must provide value	<input type="text"/>
<b>What is the due application date for the proposal?</b> * must provide value	<input type="text"/>
<b>Proposal Type - Choose the appropriate type from the list below:</b> * must provide value <input type="checkbox"/> New - Proposal that has not been submitted previously <input type="checkbox"/> Resubmission - Proposal that has been previously submitted but not funded <input type="checkbox"/> Renewal -Proposal requesting funding for a new segment of a currently funded project (i.e., phase of a project)	

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<sup>55</sup> Source Judith Mbanza, Appendix 1: Proposal Routing Intake Form

☐ Competing Continuation - Proposal requesting submission to complete an additional segment of a current original award.

☐ Supplement - Proposal requesting additional funds to complete an existing or new activity of a currently funded project.

**Funding type - Choose the appropriate type from the list below:**

\* must provide value

☐ Grant - financial assistance mechanism providing funds

☐ Contract - Is a procurement agreement. (A contract usually requires explicit deliverables and a defined scope of work)

☐ Cooperative agreement - Financial assistance award with substantial sponsor programmatic involvement.

**Activity Type - Choose the appropriate research activity type from the list below**

\* must provide value

☐ Applied Research - Research conducted to gain the knowledge/understanding to meet a specific, recognized need

☐ Basic Research - Research was undertaken primarily to acquire new knowledge without any particular application or use in mind; also called fundamental research

**Proposed research requires - Check all that may apply to your proposal and provide details**

\* must provide value

☐ Additional Insurance - Insurance in addition to what is already provided by the University in regards to personnel, space, transportation, etc.

☐ Additional Space - Office/laboratory/other space that is currently unavailable to you or your department.

<input type="checkbox"/> Space renovations - Equipment or other needs that necessitate renovations to current space in order to be in compliance or to perform the research.	
<b>Does the Project performance involve an off-campus location or includes off-campus field research</b>  * must provide value	<input type="text"/> <input type="radio"/> Yes <input type="radio"/> No
<b>Are Consultant(s) - required for your project?</b>  * must provide value	<input type="text"/> <input type="radio"/> Yes <input type="radio"/> No  Personnel providing expert opinion, analysis and testing services, product and process development, or other professional services based on existing knowledge
<b>Will you have subcontractor(s) on this project?</b>  * must provide value	<input type="text"/> <input type="radio"/> Yes <input type="radio"/> No
<b>Does the Sponsor limit F&amp;A (indirect) costs?</b>  * must provide value	<input type="text"/> <input type="radio"/> Yes <input type="radio"/> No

**Give the proposed/estimated project Start and End dates**

\* must provide value

The review process for proposals generally take 6 months, so plan accordingly for anticipated starting dates

**Proposed Budget Includes - (check all that apply)**

☐

Salary

☐

Equipment amounts greater than \$5,000 ( are considered capital equipment)

☐

Personnel

**Proposed Budget requested from the Sponsor**

\* must provide value

Enter your abbreviated proposed budget, broken down by Direct and Indirect costs

**Is cost sharing proposed on this project?**

\* must provide value

☐

Yes

☐

No

**Institutional & Regulatory Compliance Information - Check any that may apply to the proposal**

\* must provide value

☐

Chemical Agents

<input type="checkbox"/> Hazardous Materials <input type="checkbox"/> Radioactive Material <input type="checkbox"/> Infectious Agents These special considerations require approval by compliance bodies	
<b>Will this research include using Human Subjects?</b>  * must provide value	<input type="checkbox"/> Yes <input type="checkbox"/> No
<b>Is there a real or potential conflict of interest in connection with this work involving an institutional employee?</b>  * must provide value	<input type="text"/> <input type="radio"/> Yes <input type="radio"/> No
<b>Do you have the following documents (at a minimum) that should be included in the routing packet</b>  * must provide value  <input type="checkbox"/> Proposal abstract <input type="checkbox"/> Budget & budget justification <input type="checkbox"/> Any supporting documentation	
Submit	

Save & Return Later

[Powered by REDCap](#)



## Appendix 2: Grants Writing Task Schedule Template<sup>56</sup>

Work Plan For \_\_\_\_\_

APPLICATION DUE DATE: \_\_\_\_\_

INTERNAL APPLICATION DATE: \_\_\_\_\_

	DOCUMENT	TIMELINE FOR COMPILATION/COMPLETION		PERSON/S RESPONSIBLE - lead (proposed)	PERSON/S RESPONSIBLE - review/support (proposed)	WAYFORWARD AND ACTIONPOINTS	STATUS
		Expected date for first draft	Expected date of completion				
1	Title (200 character limit)						
2	Cover letter						
3	Project Summary/Abstract ( <i>no longer than 30 lines of text</i> )						
4	Project Narrative ( <i>no more than two or three sentences</i> )						
5	Facilities & Resources						
6	Research Strategy ( <i>Note: The Research Strategy component R21 is limited to 6 pages</i> )						
7	Specific aims ( <i>1 page</i> )						
8	Protection of Human Subjects						
9	Inclusion of Women and Minorities						
10	Inclusion Enrollment Table						
11	Inclusion of Children						
12	Bios – For key personnel						
13	LOS – list of LOS						
14	a. Budget (Research & Related)						
15	Budget Justification						
16	Bibliography & References						
17	Subaward budget ( <i>if required</i> )						

<sup>56</sup> Source Judith Mbanza, Appendix 2: Grants Writing Task Schedule Template

## **Curriculum Vitae**

Judith Mbanza Bumpenje holds a Bachelor of Arts Degree in Social Sciences (B.A. S.S) and a Master of Arts Degree in Public Administration and Management (MAPAM). Both degrees were awarded at Makerere University Kampala, Uganda. For the last 12 years, she has worked at MU-JHU Care Limited, a Uganda not for profit research collaboration between Makerere University and Johns Hopkins University. Her passion for grants management has seen her progress to the position of a Grants and Procurement Manager where she's responsible for supporting the pre-award research administration processes and portions of post-award management.

In 2016, she was nominated for sponsorship through the G11 Fogarty grant to pursue the Master of Science Degree in Research Administration at Johns Hopkins University, Krieger School of Arts and Sciences which culminated in writing this capstone project. Her passion as a research administrator continues to grow and she's enthusiastic to keep herself abreast of the undertakings in the research administration arena through continued training and networking with other research administrators to share best practices.